IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl.No.:	10/081,355	Confirmation No.: 9762
Appellant:	Anandakumar et al	
Filed:	February 21, 2002	
TC/AU:	2654	
Examiner:	Pierre	
Docket:	TI-29773	
Cust.No.:	23494	

SUBSTITUTE APPEAL BRIEF

Commissioner for Patents
P.O.Box 1450
Alexandria VA 22313-1450

Sir:

In response to the Notification of Non-Compliant Appeal Brief mailed 08/31/2006, appellant hereby submits the attached sheets which contain the Rule 41.37 items of appellant's substitute Appeal Brief. The fee for filing a brief in support of the appeal has previously been paid. The Director is hereby authorized to charge any other necessary fees to the deposit account of Texas Instruments Incorporated, account No. 20-0668.

Respectfully submitted,

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Rule 41.37(c)(1)(i) Real party of interest

Texas Instruments Incorporated owns the application.

Rule 41.37(c)(1)(ii) Related appeals and interferences

There are no related dispositive appeals or interferences.

Rule 41.37(c)(1)(iii) Status of claims

Pursuant to MPEP 1205.02, for each claim in the case appellant states the status as follows:

Claim 1: rejected

Claim 2: rejected

Claim 3: rejected

Claim 4: rejected

Claim 5: rejected

Claim 6: rejected

Claim 7: rejected

Claim 8: rejected

Pursuant to MPEP 1205.02, appellant identifies each claim on appeal as follows

Claim 1: on appeal

Claim 2: on appeal

Claim 3: on appeal

Claim 4: on appeal

Claim 5: on appeal

Claim 6: on appeal

Claim 7: on appeal

Claim 8: on appeal

Rule 41.37(c)(1)(iv) Status of amendments

There is no amendment after final rejection.

Rule 41.37(c)(1)(v) Summary of claimed subject matter

The independent claims on appeal consist of method claim 1, method claim 4, and apparatus claim 7.

The subject matter of claim 1 is a method for playout of packetized digital speech by deferring truncation of an active frame (application page 11, lines 27-28) and truncating a silence frame (application page 11, lines 26-27).

The subject matter of claim 4 is a method of digital speech frame playout expansion by classifying a frame as voiced or not (application page 12, lines 26-27) and expanding a voiced frame by a multiple of the pitch of the voiced frame (application page 13, lines 6-8).

The subject matter of claim 7 is a receiver for encoded digital speech with an input for receiving CELP-encoded frames (application page 14, line 27 to page 15, line 1) a decoder coupled to said input (application page 14, lines 27-28) and a playout scheduler coupled to said input (application page 14, lines 27-28) where the decoder provides expansion of a voiced frame in response to the playout scheduler (application page 12, lines 26-27) and the expansion is a multiple of the pitch for the voiced frame (application page 13, lines 6-8).

As background, the claimed subject matter relates to playout (scheduling and decoding) of packetized frames of digital speech when packets arrive late: claim 1 relates to playout methods which truncate frames (used to reduce a too-large playout delay), claim 4 relates to playout methods which expand frames (used to fill in when playout delay has jump increase), and claims 7-8 relate to receivers capable of playout including (decoded) frame truncation and expansion as in claims 1 and 4. In general, frames of digital speech may be encoded (to reduce the number of bits required) and transmitted over networks in the form of packets analogous to data transmission (e.g., VoIP over the Internet), but transmission delays may cause packets to arrive late. In this case, playout methods attempt to manage the time gap caused by the late frames; Fig.1 illustrates varying arrival times and the expansion of frame m by repeated portions $T^{(m)}$ until frame m+1 is available. After the late arrivals, the playout

methods attempt to reduce the increased playout delay back towards a target playout delay by shortening the length of some frames.

More particularly, for claim 1, application page 11, last paragraph and page 12, middle paragraph describe the shortening of frames by truncation of silence frames (e.g., a 20 millisecond frame shortened to 4 milliseconds by cutting off the last 16 milliseconds), but not truncating active speech frames.

For claim 4, application page 12, last paragraph to page 13, paragraph (1) describe the expansion of voiced frames by integer multiples of the pitch as illustrated in Fig.1 where frame m is expanded with three repeats of a pitch length portion labeled $T^{(m)}$.

For claim 7, Fig.5 illustrates the functional blocks of a receiver which provides playout frame expansion as in claim 4.

<u>Rule 41.37(c)(1)(vi) Grounds of rejection to be reviewed on appeal</u>

The grounds of rejection to be reviewed on appeal are:

Claims 1-6 were rejected under 35 USC § 102(e) as anticipated by Gersho et al. (6,311,154).

Claims 7-8 were rejected under 35 USC § 103(a) as unpatentable over Gersho et al. (6,311,154) in view of Maeda et al. (5,839,110).

<u>Rule 41.37(c)(1)(vii) Arguments</u>

Claims 1-6 were rejected under 35 USC § 102(e) as anticipated by Gersho et al. (6,311,154).

<u>Claims 1-3</u>: The Examiner asserted that encoding meets the claim 1 limitation of "truncation" and cited Gersho column 5, lines 49-51, column 19, lines 44-50, column 8, lines 23-27 plus blocks 34, 36, and 42 of Fig.8 for showing deferral required by claim 1, clause (a) and cited Gersho column 14, lines 40-42 and column 8, lines 23-27 for the silence frame required by claim 1, clause (b). However, truncation and encoding are not the same thing, and Gersho fails to anticipate claim 1 for several reasons, as follows:

(1) Claim 1 requires playout (e.g., scheduling and decoding) of packetized frames, whereas Gersho Fig.8 is an encoder (column 14, lines 52-54) and is

essentially irrelevant. The more pertinent part of Gersho is the decoder of Fig.14.

(2) Cited Gersho column 5, lines 49-51 is the entry in the Brief Description of the Drawings for Fig.8 and simply states that Fig.8 is a block diagram of a coder and nothing further. There is no suggestion of frame truncation.

(3) Cited Gersho column 19, lines 44-50 describes the choice of a window length of either 16 or 24 samples, depending upon the pitch in the frame. As explanation, column 19, lines 52-55 state a window is defined around each epoch, and column 19, lines 6-7 state epochs represent centers of windows in the frame. And column 7, lines 34-50 state that a window is an active interval with most of the energy of the excitation; that is, a window is within an active frame. There is no suggestion of frame truncation.

(4) Cited Gersho column 8, lines 23-27 state a subframe boundary is moved if a window crosses the boundary. As explanation, Fig.2 and column 7, lines 18-27 state a frame is partitioned into M subframes of nearly equal length. Again, no suggestion of frame truncation.

(5) Cited Gersho Fig.8 blocks 36, 34, and 42 do the following: block 36 checks a frame of 160 samples for speech activity or silence (column 15, lines 25-26); block 34 is the first step in classifying a frame with activity into voiced, unvoiced, or transition (column 16, lines 5-7); and block 42 encodes the excitation and synthesizes speech for the frame as shown in Fig.9 (column (column 18, lines 42-43). And Fig.9 shows three encoders, one for each active frame class, but does not suggestion frame truncation. Indeed, the plain English meaning of "truncate" is "shorten by cutting off". Thus truncating a frame means discarding some of the samples of the frame, such as truncating a 20 ms frame with 160 samples, x[0], x[1], ..., x[159], to 4 ms would mean retaining samples x[0], x[1], ..., x[31] and discarding samples x[32], x[33], ..., x[159]. Gersho has no suggestion of frame truncation. The Examiner's assertion of coding as the same as truncating confuses two separate ideas: truncation of a frame versus coding with quantization of parameter values which may use truncation of least significant bits to lower the bit count. Truncation of a frame shortens the frame

by discarding samples of the frame, whereas coding (as in Gersho) takes all of the samples of the frame and generates a set of parameters (e.g., LP filter coefficients, pitch, gain, excitation, etc.) with a small number of bits which can be transmitted at a low bit rate and then can be used to reconstruct an approximation of the all of the samples of the frame. But such truncation as part of coding is not related to truncation of the frame which discards samples. As an analogy, simply quantizing the data would lower the bit count; for example, the 160 samples of a frame may have 16-bit integer format, and quantizing (truncating) each sample to 8-bit integer format by discarding the 8 least significant bits would retain all 160 samples, but each sample would have lower resolution. That is, truncation of each sample's least significant bits is not truncation of the frame which would discard samples to shorten the frame.

(6) Cited Gersho column 14, lines 40-42 states that the first stage of the frame classifier (block 34 of Fig.8) decides whether the frame is unvoiced or not. No suggestion of frame truncation.

(7) Cited Gersho column 19, lines 44-50 was previously argued in (3).

(8) Cited Gersho column 8, lines 23-27 was previously argued in (4).

In short, Gersho does not suggest frame truncation, and consequently does not suggest independent claim 1 or its dependent claims 2-3.

<u>Claim 4-6</u>: The Examiner cited Fig.14 elements 10e/10g for the claim 4, clause (a) requirement of frame classifying, and cited Fig.14 elements 10g-10h, column 28, lines 46-53, column 15, lines 23-24, and column 8, lines 23-27 for claim 4, clause (b) requirement of voiced frame expansion by pitch multiples. However, again Gersho fails for many reasons as follows.

(1) Cited Gersho Fig.14, elements 10e/10g indicates construction of the excitation for either an unvoiced or a voiced frame; however, claim 4, clause (a) requires a classifying of the frame. In contrast, Gersho Fig.14, element 10a does decode the classification of the incoming frame, so Fig.14 does indeed show the frame classifying of claim 4, clause (a).

(2) Cited Gersho Fig.14, elements 10g-10h construct the excitation for a voiced frame and decode the pitch for a voiced frame, respectively; neither suggests anything beyond the usual decoding of a CELP-encoded frame. In contrast, claim 4, clause (b) requires frame expansion (i.e., after decoding the frame, expanding the frame beyond its original length) in a playout method. There is no suggestion of frame expansion in Fig.14.

(3) Cited Gersho column 28, lines 42-55 describe decoding the pitch and constructing the excitation for a voiced frame as part of decoding the frame; however, there is no suggestion of frame expansion.

(4) Cited Gersho column 15, lines 23-24 notes the bandwidth expansion correlation coefficient, R_w. Bandwidth expansion relates to moving zeroes of the transfer function of the LP filter towards or away from the unit circle in the z-plane; this is unrelated to frame expansion.

(5) Cited Gersho column 8, lines 23-27 state as part of encoding a subframe boundary is moved if a window crosses the boundary. As explanation, Fig.2 and column 7, lines 18-27 state a frame is partitioned into M subframes of nearly equal length. Again, no suggestion of frame expansion, especially of decoded frames being played out and which were classified as voiced and with the expansion being a repeat of pitch length portions.

In short, Gersho does not suggest frame expansion, and consequently does not suggest independent claim 4 or its dependent claims 5-6.

Claims 7-8 were rejected under 35 USC § 103(a) as unpatentable over Gersho et al. (6,311,154) in view of Maeda et al. (5,839,110).

<u>Claims 7-8</u>: Claim 7 relates to devices which implement the voiced frame expansion method of claim 4, so the Examiner again cited Gersho column 28, lines 42-55, column 15, lines 34-34, and column 8, lines 23-27 for frame expansion and added Maeda to show a playout scheduler. Because claim 7 requires the claim 4 voiced frame expansion, a repeat of the foregoing argument with regard to claim 4 shows that Gersho does not suggest voiced frame expansion as required by independent claim 7.

Thus Gersho suggests neither independent claim 7 nor its dependent claim 8.

Rule 41.37(c)(1)(viii) Claims appendix

1. A method for playout of packetized speech, comprising:
(a) deferring truncation of an active frame; and
(b) truncating a silence frame.

2. The method of claim 1, wherein:
(a) said packetized speech includes CELP-encoded frames; and
(b) said truncating a silence frame includes truncating an excitation for said silence frame.

3. The method of claim 1, further comprising:
(a) expanding an active frame according to a voicing classification for said active frame.

4. A method of frame playout expansion, comprising:
(a) classifying a frame as voiced or not; and
(b) expanding a voiced frame by a multiple of the pitch of said voiced frame.

5. The method of claim 4, wherein:
(a) said frames are CELP-encoded frames; and
(b) said expanding a voiced frame includes expanding an excitation for said voiced frame by a multiple of the pitch of said voiced frame..

6. The method of claim 4, wherein:
(a) said classifying a frame of step (a) classifies an active frame as one of (i) voiced, (ii) unvoiced, or (iii) transition; and
(b) expanding an unvoiced frame includes expanding an excitation for said unvoiced frame with a random fixed-codebook vector.

7. A receiver, comprising:

(a) an input for receiving CELP-encoded frames;

(b) a decoder coupled to said input; and

(c) a playout scheduler coupled to said input;

(d) said decoder operable to provide expansion of a voiced frame in response to said playout scheduler, wherein said expansion is a multiple of the pitch for said voiced frame.

8. The receiver of claim 7, wherein:

(a) said decoder operable to provide truncation of a frame in response to said playout scheduler only when said frame is a silence frame.

Rule 41.37(c)(1)(ix) Evidence appendix

none

Rule 41.37(c)(1)(x) Related proceedings appendix

none